Breakthroughs in Informatics, Networking, Algorithms, Research, and Yield (BINARY)
Volume 2 No 1 2025 | Hidayat et al | 160–176 | 2026-02-01
ISSN: 3109-5003

Mobile-Based Pottery Ordering Application UI/UX Design for Banyumulek Village Handicraft Using Design Thinking Method

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Submitted: 20 October 2025 — Accept: 20 January 2026 — Published: 1 February 2026

ABSTRACT: Banyumulek Village, known as a center for traditional pottery crafts in West Nusa Tenggara, faces challenges in digital product marketing. This study aims to design a mobile-based pottery ordering application using a UI/UX approach through the Design Thinking method. The Design Thinking methodology is applied through stages including empathize, define, ideate, prototype, and testing, involving end users directly in the design process. Data were collected through observations, interviews, and questionnaires with artisans and potential consumers. The result is a prototype application featuring a digital catalog, online payment methods, order tracking, and an intuitive and responsive user interface. Evaluation was conducted through usability testing and UX questionnaires, with success rate reaching 97.12% based on cognitive walkthrough analysis. The Post-Study System Usability Questionnaire (PSSUQ) results showed SysUse score of 1.55, InfoQual of 1.43, InterQual of 1.59, and Overall of 1.58, all within the ”very good” category. This research contributes to the development of locally-based digital solutions for empowering the creative economy in rural communities.

Keywords: UI/UX, Design Thinking, Pottery, Mobile Application, Banyumulek Village, Usability Testing.

I. INTRODUCTION

Technological developments have brought positive impacts to various sectors, including the handicraft sector. Currently, many digital applications are designed to help the general public optimize their productivity and efficiency in running their handicraft buying and selling

businesses. One example is the Maja Pedia application designed to facilitate users and sellers in conducting online transactions for handicraft products. Users simply need to select the product they want to buy, fill in the shipping address, and make a payment. After that, the product will be sent to the address filled in by the user [1].

Pottery making is essentially an applied science, and pottery making is learned not only as a traditional art passed down by ancestors but also as an effort to understand the existence of pottery in the cultural life of the local community. Pottery crafts, bamboo weaving, and wood carving in simple forms and motifs are rural community arts that remain familiar, homogeneous, and still function to bind community solidarity [2].

The handicraft sector is very important for the economic development of Banyumulek Village. However, based on current conditions, pottery handicraft sales businesses have not been able to carry out strategic initiatives such as utilizing online sales momentum. Utilizing the internet is very important for economic development in Banyumulek Village because most of the people in Banyumulek Village work as pottery artisans. However, this business is still carried out traditionally so it has not been able to provide equitable prosperity, both at local and international levels. Using traditional methods, the people of Banyumulek Village cannot provide the types of welfare that can be enjoyed by the general public.

Based on initial surveys, concerns were found among traders regarding the use of traditional markets as a place to sell. Many pottery traders peddle their products using vehicles such as cars, motorcycles, or even bicycles. This often causes losses when consumers do not buy the offered pottery. Additionally, traditional sales methods often result in low selling prices due to the bargaining process that occurs due to lack of market price information between sellers and buyers. Therefore, a pottery buying and selling system planning with ideal selling prices is needed to avoid transaction obstacles, while establishing standard fixed prices that do not depend on negotiation.

Based on the problems explained, researchers are interested in conducting research with the title ”Mobile-Based Pottery Ordering Application UI/UX Design for Banyumulek Village Handicraft Using Design Thinking Method.” This research aims to design a mobile-based application UI/UX that meets user needs and to determine the usability testing and user experience questionnaire levels on the UI/UX design of the mobile application for buying and selling pottery.

A. Problem Formulation

Based on the background described previously, this research raises several main problems:

1. How is the UI/UX design result of a pottery buying and selling application that meets user needs by applying the design thinking method?
2. What are the usability testing and user experience questionnaire levels on the UI/UX design of the mobile application for buying and selling pottery?

B. Problem Limitations

To keep this research focused on planned objectives, problem limitations are needed so as not to deviate from the research subject. These limitations include:

1. Designing UI/UX for a mobile application intended for local and international tourists.
2. Application users are limited to two groups: pottery sellers and buyers.
3. Research results include prototype creation that will be tested through usability testing and user experience questionnaires.

C. Research Objectives

This research aims to:

1. Produce designs for every UI/UX aspect of a pottery buying and selling mobile application using the design thinking approach at the prototyping stage.
2. Determine the usability testing and user experience questionnaire levels on the UI/UX design of the application.
3. Support the development of online marketing for Banyumulek Village pottery through a mobile application designed to facilitate transactions while increasing profits.

II. RELATED WORK

Several previous studies have examined UI/UX design in various e-commerce contexts. Prayoga et al. [3] researched UI/UX design on a mobile sales application at 3R Stationary using the Design Sprint method. The results showed a median value of 6.6, placing the prototype application in a satisfactory category that meets user needs.

Sanjaya & Ibadi [4] researched the UI/UX design of the Pasar Tani Ogan Ilir mobile-based agricultural buying and selling application using the Design Thinking method. The results showed that the application prototype had a click error rate of 7%, and 97.8% of respondents successfully completed tasks according to the specified route, making it feasible as a basis for future application development.

Table 1: Summary of Previous Research

No	Author (Year)	Title
1	Prayoga et al. (2022)	UI/UX Design at 3R Stationary Mobile Sales App
2	Sanjaya & Ibadi (2023)	UI/UX Design of Pasar Tani Ogan Ilir
3	Karo Sekali et al. (2023)	UI/UX Design for Men's Fashion Products at Celcius Store
4	Rosiana et al. (2023)	UI/UX Design of Mobile-Based Agricultural Purchase Information Syste

Karo Sekali et al. [5] researched UI/UX design for a mobile application for men's fashion products at Celcius Store in Manado City using the Design Thinking method. The usability

testing results showed a System Usability Scale (SUS) score of 95 out of 100 and a Single Ease Question (SEQ) score of 6.85 out of 7, indicating the application design is easy to use and users feel satisfied.

Rosiana et al. [1] researched UI/UX design of a mobile-based agricultural purchase information system using the Design Thinking method. The testing results showed the E-Tani application can provide a better user experience and increase efficiency and productivity.

The difference between this research and previous studies lies in the research object, which focuses on pottery handicraft products from Banyumulek Village with unique local cultural characteristics. Additionally, this research uses the PSSUQ (Post-Study System Usability Questionnaire) instrument which measures four dimensions: SysUse, InfoQual, InterQual, and Overall.

III. METHOD

This research uses the Design Thinking method, which includes the mobile application design process for pottery buying and selling. The process begins with observation, interviews, and questionnaire distribution, and ends with testing through usability testing. Based on the problems raised, this research uses a quantitative approach. The Design Thinking method was chosen because it directly involves potential users as the central reference in the design process, resulting in designs that suit their needs and expectations.

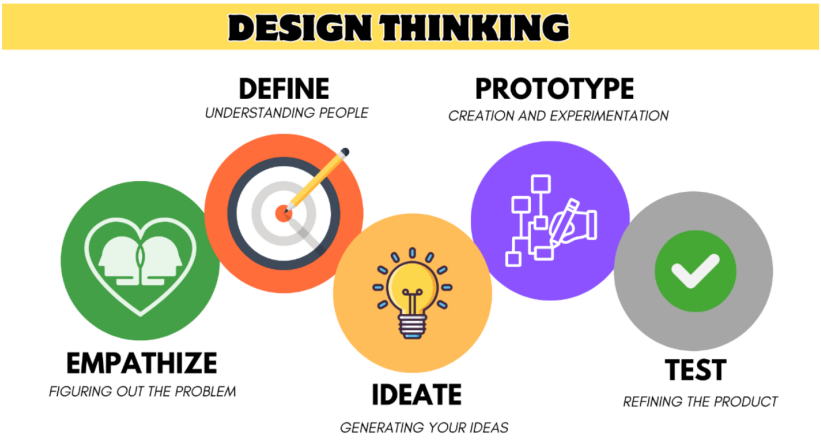

Figure 1: Design Thinking Stages

A. Research Object Identification

The population in this study is Banyumulek Tourism Village, located in Kediri District, West Lombok Regency, which has an area of approximately 42 hectares. Banyumulek Village is inhabited by around 2,728 families or equivalent to 8,750 people. Most of the Banyumulek tourism village community work as pottery handicraft artisans and art shops.

Banyumulek Tourism Village is the largest handicraft-producing tourism village in West Nusa Tenggara Province. The pottery handicrafts produced by the Banyumulek village

community are very unique, where the production process still maintains traditional methods passed down through generations as an authentic and sustainable local wisdom.

B. Data Collection

Data collection was carried out through three methods: observation, interviews, and questionnaires.

3.2.1 Observation

Observation was conducted to design a mobile-based pottery sales application with a UI/UX approach. The first observation was conducted on December 14, 2024, observing user activities when selling pottery. This aimed to identify problems faced by users, which can become the basis for designing a more effective and efficient UI/UX process.

Figure 2: Observation with Mr. Zainudin, Former Chairman of the Art Market

3.2.2 Interview

Researchers interviewed the Banyumulek village community, especially pottery artisans and the general public, to obtain accurate data. Semi-structured interview techniques were used, which rely on question guidelines but provide flexibility to develop questions according to the discussion context.

3.2.3 Questionnaire

Questionnaires were distributed to consumers and the general public. The questionnaire contained several response items for each level of need that helps facilitate accessibility and refers to online sales services.

C. Research Procedure

The Design Thinking method consists of five interrelated stages:

3.3.1 Empathize

At this stage, designers conduct observations, interviews, and questionnaires to understand the activities, needs, and characteristics of potential users. This stage also aims to identify problems faced by potential users.

Figure 3: Banyumulek Tourism Village Art Market Office

3.3.2 Define

Define is the stage of building ideas that become the basis for prototype design. This process functions as a transition from formulated problems to solutions designed to meet user needs.

3.3.3 Ideate

This stage is an idea collection process through brainstorming to obtain ideas after problem solving. The brainstorming process is done by writing all ideas on sticky notes using Miro.

3.3.4 Prototype

Prototype creation includes:

- Low-fidelity wireframe: the most basic visual representation
- High-fidelity wireframe: wireframe design type with the best design detail
- Design system: maintaining consistency in every visual element

- Prototyping: using Figma software to direct designed buttons to relevant pages

3.3.5 Testing

Testing was conducted using the Cognitive Walkthrough method and PSSUQ (Post-Study System Usability Questionnaire) questionnaire.

D. Data Analysis

The PSSUQ (Post-Study System Usability Questionnaire) was used to measure user satisfaction. PSSUQ has four subscales:

1. SYSUSE (System Usefulness) - measures system usefulness
2. INFOQUAL (Information Quality) - measures information quality
3. INTERQUAL (Interface Quality) - measures interface quality
4. OVERALL - overall satisfaction

Table 2: Participant Criteria

Criteria	Description
Demographics	Age 17-45 years, Male and Female
Geographics	Living in Banyumulek Village
Psychographics	Smartphone User
Behaviour	Have made online purchases/sales, Pottery seller or buyer

E. System Evaluation

Usability testing was conducted with 13 participants who performed 8 scenarios:

1. ST1: Login to application
2. ST2: Code verification
3. ST3: Search for products
4. ST4: Buy products
5. ST5: Product payment
6. ST6: Track orders
7. ST7: Chat & contact courier
8. ST8: Check activity with order history, ongoing, scheduled, and draft features

IV. RESULT AND DISCUSSION

A. Banyumulek Village Pottery Types

Table 3: Pottery Types and Forms in Banyumulek Village

Pottery Name	Form & Function
Cobek	Tool for cooking and making spices
Clay Glass	Drinking utensil
Clay Plate	Eating utensil
Coffee Roaster	Tool for roasting coffee
Perapen	Tool for grilling satay
Flower Vase	Decorating flower holders

B. Prototype Design Results

The UI design consists of a color style guide, typography, icons, illustrations, and design operations. The main colors used for UI and UX recommendations are dark red #852221, orange #5E6EFF, black #4C3BCF, and white #FFFFFF.

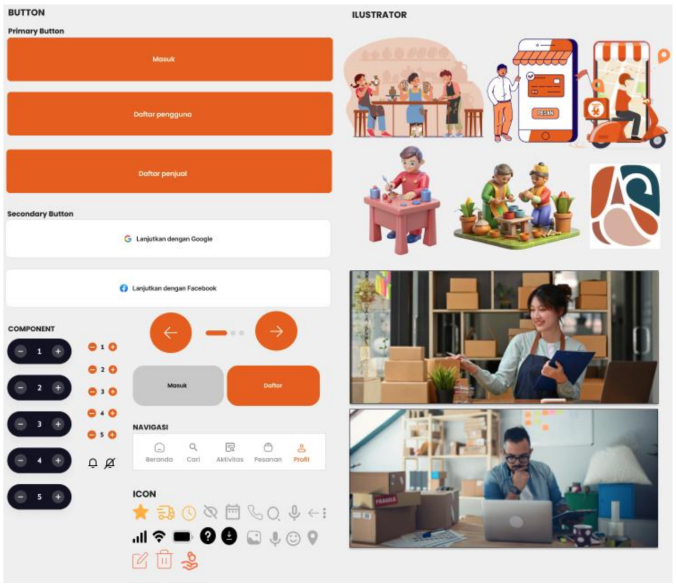

Figure 4: GRATA Art Market Application UI/UX Colors

Poppins font is a versatile and modern geometric sans-serif font, often used in web and mobile app designs because it is easy to read and has a neat appearance.

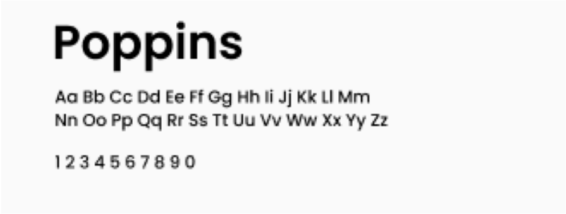

Figure 5: Poppins Font Style

Figure 6: GRATA Art Market UI/UX Components

C. User Interface Display

4.3.1 Onboarding

The onboarding display appears when users first use the application before registering or logging into the application.

Figure 7: Onboarding Display

4.3.2 Home Page

The home page contains various information related to products and quick features for finding products, making it easier for users when wanting to buy pottery products.

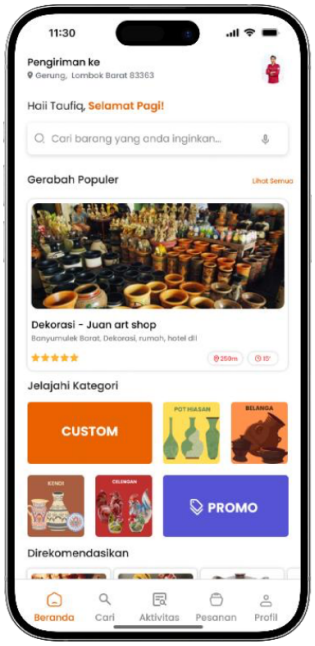

Figure 8: GRATA Art Market Application Home Page

4.3.3 Product Search

Users can search for desired pottery product targets, making it easier for application users to find products.

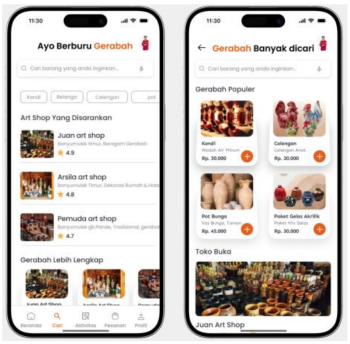

Figure 9: Product Search Display

4.3.4 Product Details and Reviews

Contains more complete product specifications, both from clearer displays and descriptions.

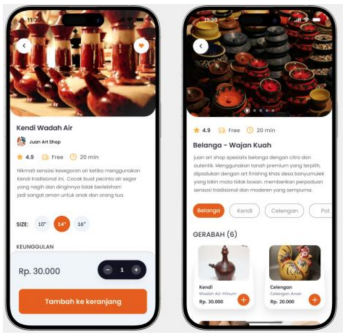

Figure 10: Product Details and Reviews

4.3.5 Cart and Orders

Contains shopping carts and orders that have been added by visitors or buyers who want to transact pottery products.

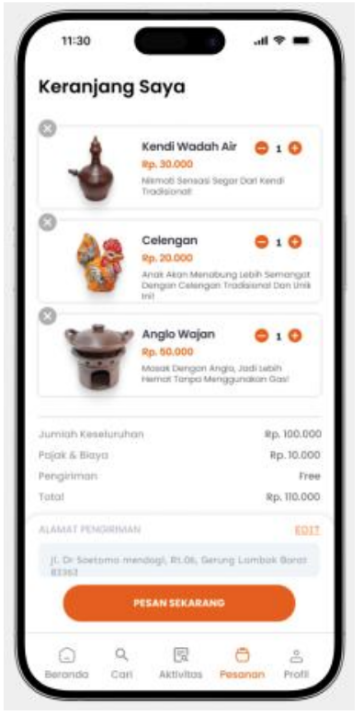

Figure 11: Cart and Orders Display

4.3.6 Payment Methods

Digital payment features make it easier for buyers in this modern era because overall, most people are already familiar with digital transactions.

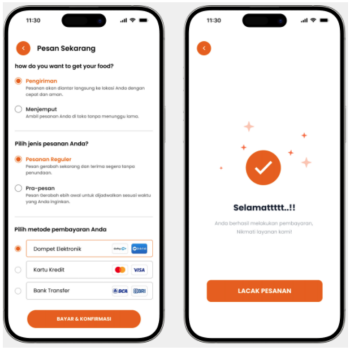

Figure 12: Payment Methods

4.3.7 Order Tracking

This feature is very modern and widely used because it is needed by buyers to track packages or orders.

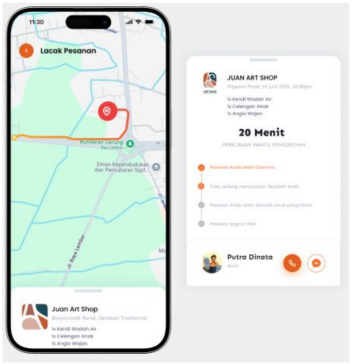

Figure 13: Order Tracking Display

4.3.8 Seller Interface

The seller interface design is not much different from the user interface, consisting of color style guides, typography, icons, illustrations, and design operations.

D. Usability Testing Results

4.4.1 Cognitive Walkthrough Results

Table 4: Scenario Testing Results

Participant Code	ST1	ST2	ST3	ST4	ST5	ST6	ST7	ST8
R1-R13	S	S	S	S	S	S	PS	S
S = Success, PS = Partial Success, F = Failed								

Success Rate = (Success + (Partial Success × 0.5)) / Total Task × 100%
= (98 + (6 × 0.5)) / 104 × 100% = 97.12%

4.4.2 PSSUQ Questionnaire Results

Table 5: SysUse Score Results

Parameter	Value
Average SysUse Score	1.55
Category	Very Good

Based on the conclusions obtained from the SYSUSE subscale results, the average value is 1.55. Based on the reference scale used in this study, this value is included in the very good category because it is below the reference scale's lower limit. This shows that the mobile-based pottery ordering application has a very high level of system usefulness.

Table 6: InfoQual Score Results

Parameter	Value
Average InfoQual Score	1.43
Category	Very Good

The average INFOQUAL value is 1.43, which is below the lower limit of the PSSUQ reference scale norm. This shows that the information quality presented by the application is very good, where the displayed information is easily understood by users and suits their needs.

Table 7: InterQual Score Results

Parameter	Value
Average InterQual Score	1.59
Category	Very Good

The average INTERQUAL value is 1.59, below the lower limit of the PSSUQ reference scale norm. These results indicate that users are very satisfied with the application's interface display.

Table 8: Overall Score Results

Parameter	Value
Average Overall Score	1.58
Category	Very Good

The average OVERALL score is 1.58, below the reference scale's lower limit. This shows that overall, users are very satisfied with the application, and the application can meet user needs in conducting pottery buying and selling transactions effectively, comfortably, and easily.

E. Discussion

The results of this study indicate that the Design Thinking method is effective in designing UI/UX for a pottery ordering application in Banyumulek Village. With a success rate reaching 97.12%, users can complete all given scenarios well.

When compared with previous research, this study shows superior results. Sanjaya & Ibadi [4] reported a click error rate of 7% with 97.8% task completion, while this study obtained a success rate of 97.12%. Karo Sekali et al. [5] obtained a SUS score of 95 out of 100, while this study using PSSUQ obtained an Overall score of 1.58, which is in the very good category.

Based on interview results, users stated that they found it easier to perform predetermined scenarios because all features are fulfilled and very flexible, saving time without many confusing stages. Features are maximized but according to needs, making it easier for users to understand.

F. User Prototype Results

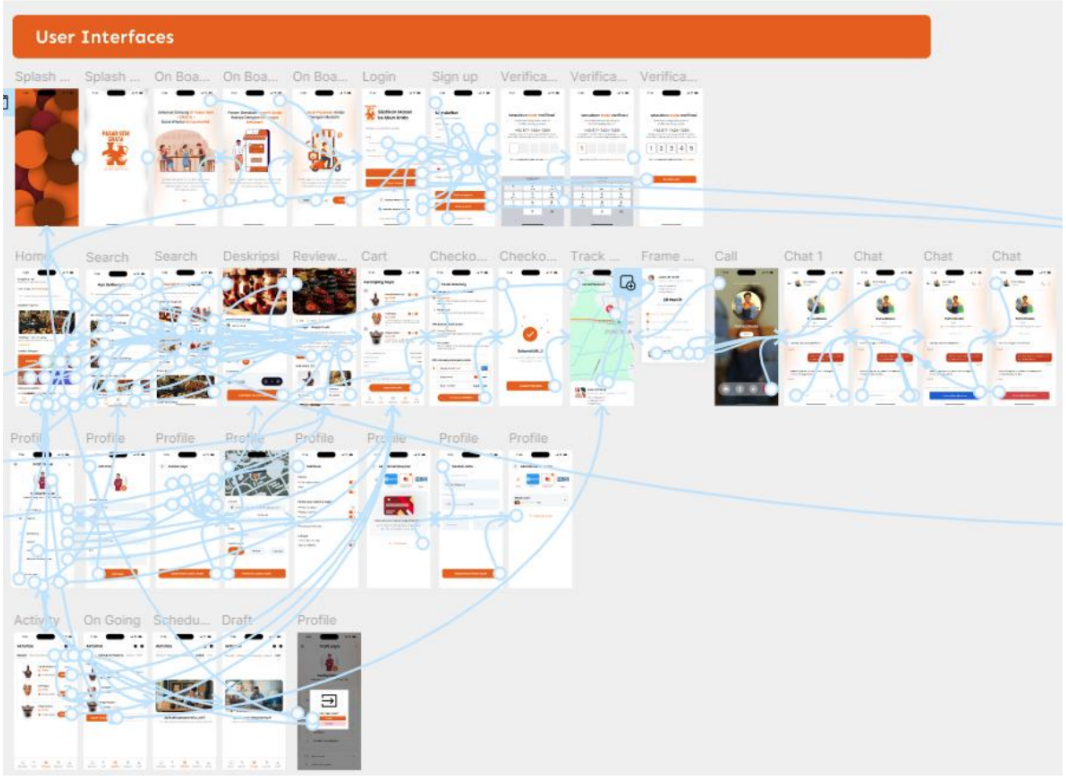

Figure 14: User Prototype Results

Figure 15: Seller Prototype Results

V. CONCLUSION

Based on the research results that have been conducted, the mobile-based pottery ordering application UI/UX design for Banyumulek Village is able to answer the needs of artisan communities in marketing their products more widely. The design process using the Design Thinking method through five stages (empathize, define, ideate, prototype, and testing) each made important contributions to the final design result.

The results of observations, interviews, and questionnaires showed a significant need for a digital platform that can improve the pottery transaction system which has so far been traditional. The UI/UX design of this application produces a prototype with features such as product catalogs, detailed information, shopping cart system, digital payment methods, and order tracking.

Usability testing showed that the application prototype has a high level of ease of use and meets user expectations. The cognitive walkthrough results showed a success rate of 97.12%, while the PSSUQ results showed SysUse (1.55), InfoQual (1.43), InterQual (1.59), and Overall (1.58), all in the very good category.

This research also shows that the Design Thinking approach is effectively applied in UI/UX design of mobile-based applications in the handicraft sector. Direct user involvement from the early design stage is able to produce designs that are more responsive to real needs in the field. Overall, this research makes a positive contribution to the development of digital ecosystems for the local handicraft sector in the era of technological transformation.

A. Suggestions

Based on the research results and testing of mobile-based pottery ordering application UI/UX design using the Design Thinking method, the author provides the following suggestions:

1. Continuous improvement of service quality and application features needs to be done by paying attention to comfort, ease, and user needs from artisans and consumers through regular usability evaluations.
2. The use of usability measurement methods can be done not only through questionnaires but also with other instruments such as System Usability Scale (SUS), User Experience Questionnaire (UEQ), or Single Ease Question (SEQ).
3. In future usability testing, other methods such as Heuristic Evaluation, Goal-Directed Design, and Lean UX can be added.
4. Respondent selection should be done more diversely involving various age groups, professional backgrounds, and experience in using digital applications.
5. For further application development, it is recommended to add real-time order status tracking features, transaction notifications, and more varied payment systems.

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